



# Power/mation®

## PRECISEFLEX 400 *The World's First Collaborative SCARA Robot by Precise Automation*

The PF400 is the world's first collaborative four-axis SCARA robot. The PF400 is specifically designed to limit all collision forces, unlike more traditional robots. At full speed, the PF400 is designed to not injure users or other equipment, permitting the robot to operate effectively alongside personnel.

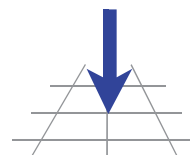
A revolutionary combination of precision and capability, The PF400 brings low cost and quiet performance to environments where automation could never go before:

- **Desktops of analytical labs**
- **Mixed manufacturing assembly applications side by side with operators**
- **Clinical diagnostic environments.**

The harnesses, controller and power supply are embedded within the robot to eliminate extra enclosures and simplify installation. Space saving design and novel geometry allow the PF400 to service stations in extremely small workcells. Combined with absolute encoder servo motors, the collaborative aspects of the robot significantly reduce the size and cost of an automated cell. It is lightweight, can be mounted on a tabletop and quick to operate, with just the AC power cord and an ethernet cable to plug in.

In addition to implementing special algorithms that contribute to the collaborative nature of this robot, Precise Automation's Guidance Motion Controller provides advanced features:

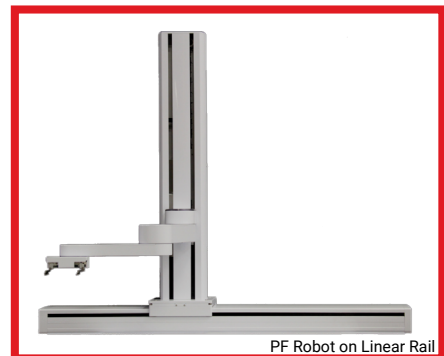
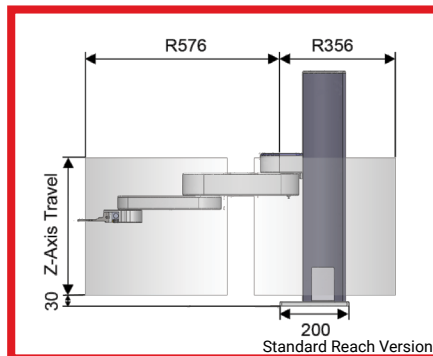
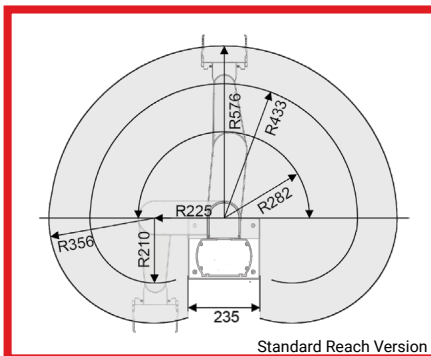
- **Kinematics for Cartesian control**
- **Gravity balanced free mode teaching**
- **Vision interface for advanced sensing**
- **Absolute encoder servo motor control for quiet operation and motionless homing**
- **Embedded web server, permitting local, wireless or remote operation**



## PRECISE AUTOMATION

# PRECISEFLEX 400

General Specifications	Range & Features
<b>Range of Motion &amp; Resolution</b>	
J1 (Z) Axis	400 mm standard, 750 mm or 1160 mm options available
J2 Axis	+/- 90 degrees
J3 Axis	+/- 167 degrees
J4/Theta Axis	+/- 970 degrees
Gripper	Standard servo gripper can grip Life Science plates in both portrait and landscape orientations. Software can control squeeze force (between approximately 0-23N for close force, 0-10N for open force) and open/close speed. Safety features include: (1) protection against dropping parts when the robot is powered down or e-stop pressed (gripper provides 7-10N of close force when motor power is off) and (2) detection of when a part is being held by the gripper. Options include gripper fingers and special servo grippers for handling vials and test tubes.
Maximum reach	Standard Reach Version: 576 mm Extended Reach Version: 731 mm
Repeatability	+/- 90 µm overall in x, y & z directions at 18-22 degrees C
<b>Performance and Payload</b>	
Maximum Acceleration	0.2G with 500 gm payload (standard reach, extended reach slightly slower)
Maximum Speed	500 mm/sec with 500 gm payload (standard reach, extended reach slightly slower)
Maximum Payload	1kg including gripper, 0.5kg with typical 0.5kg gripper
Motors	Brushless DC servo motors with absolute encoders on axes J1-J4, no motion during homing.
<b>Interfaces</b>	
General Communications	RS-232 channel, 10/100 Mbps Ethernet port, E-stop input, all available on J1-Axis housing Facilities Panel at the robot base
Digital I/O Channels	One optically isolated input available on J1-Axis housing Facilities Panel. Option available for an additional 12 optically isolated digital inputs and 8 optically isolated digital outputs on J1-Axis housing Facilities Panel. Two digital inputs can be optionally converted to analog inputs. Additional remote I/O available via Precise RIO modules or 3 <sup>rd</sup> party MODBUS/TCP devices
Operator Interface	Web based operator interface supports local or remote control via browser connected to embedded web server
Programming Interface	Three methods available: DIO MotionBlocks (PLC), embedded Guidance Programming Language (standalone, modeled after Visual Basic.Net), PC control using open source TCP/IP Command Server operated via Ethernet connection (TCP).
<b>Required Power</b>	Input range: 90 to 264 VAC, single phase, 50-60 Hz, 365 watts maximum
<b>Weight</b>	20 kg for 400 mm travel version
<b>Linear Rail Option</b>	
Configurations	Any model of the PF400 can be mounted on the Linear Rail with all of the robot's interfacing cables routed internally in the Rail.
Repeatability	+/- 50 µm
Maximum Speed	700 mm/sec
Dimensions	1 M travel version – 1.37 m long x 0.23 m deep x 0.12 m high 1.5 M travel version – 1.87 m long x 0.23 m deep x 0.12 m high 2 M travel version – 2.37 m long x 0.23 m deep x 0.12 m high



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